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10/629,024	07/28/2003	Peter G. Webb	10003513-2	7639

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EXAMINER

GROSS, CHRISTOPHER M

ART UNIT	PAPER NUMBER
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1639

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Responsive to communication entered 2/21/2006. Claims 17-34 are pending.
Claims 1-16 are canceled. Claims 17-34 are examined herein.

Election/Restrictions

1. Applicant's election with traverse of group II, claims 17-28 and 32 in the reply entered on 2/21/2006 is acknowledged. The traversal is on the ground(s) that the elements of group II are also present in group III. Applicant's arguments are persuasive and claims 29-31 and 33-34 are hereby rejoined.

Priority

2. This application is a DIV of application 09/628963, filed on 7/31/2000 (now PAT 6599693).

Applicant's claim for the benefit of a prior-filed application under under 35 U.S.C. 121 is acknowledged.

Information Disclosure Statement

The information disclosure statement filed 2/21/2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein regarding WIPO documents 98/41531 and 95/25116 has not been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the **second** paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 24 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 24 and 32 recite the limitation "step (a)" in line 1. There is insufficient antecedent basis for this limitation in the claim. The independent claims from which claims 24 and 32 both stem are drawn to an apparatus, comprising parts, elements, etc. rather than a method which would comprise steps. Thus, due to ambiguity in the language, the metes and bounds of the claims, as written, are unascertainable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 17, 18, 20-23, 25, 26, 28 and 29-31, 33-34 are rejected under 35 U.S.C. 102(a or e) as being anticipated by Gamble et al (US Patent 6001309).

The claimed invention is drawn to an apparatus for fabricating an array, comprising: (a) a head system with multiple pulse jet drop dispensers; (b) a transport system to move the head system with respect to a substrate; (c) a processor which controls the head and transport system so as to deposit at least one set of drops from a corresponding same dispenser onto a substrate for each of multiple sets of neighboring features, so as to form the array with the feature sets formed from drops deposited by respective different dispensers. Claims 18, 20-23, 25, 26 and 28 represent variations thereof. Claims 29-31, 33-34 are drawn to a computer program for controlling the apparatus set forth in claims 17, 18, 20-23, 25, 26 and 28.

Gamble et al teach, throughout the document, and especially figures 6 and 10, column 13 line 28 and column 1 lines 33-39, an apparatus comprising jets formed in arrays, an x-y positioner and a master controller, all for fabricating large arrays of microspots comprising biological oligomers. The tight microspots of Gamble et al circumvent the problem of contaminating "satellite" droplets.

The apparatus for fabricating of large arrays of microspots of Gamble et al reads on the 'apparatus for fabricating an array' of the preamble of claim 17. The jets formed in arrays of Gamble et al read on the 'head system with multiple pulse jet drop dispensers' of claim 17 part (a) as well as 'the different dispensers of the head system are moved in unison by the transport system' of claim 22. The x-y positioner of Gamble et al reads on the 'transport system to move the head system with respect to a

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substrate' of claim 17 part (b). The master controller of Gamble et al reads on the 'processor which controls the head and transport system' of claim 17 part (c).

Gamble et al teach in column 9, lines 15-18 that the groups of jets can provide a plurality of spots being formed simultaneously, concurrently or consecutively, in an interrupted manner. Furthermore, in column 12, lines 26-28 Gamble et al state there is an advantage to include 2 to 3 fold [spot] redundancy, therein providing neighboring feature sets.

Simultaneous or concurrent drop deposition with two identically loaded heads of Gamble et al reads as capable of 'deposit[ing] at least one set of drops from a corresponding same dispenser onto a substrate for each of multiple sets of neighboring features, so as to form the array with the feature sets formed from drops deposited by respective different dispensers' of claim 17 part (c). Whereas, consecutive deposition of Gamble et al reads as capable of 'different dispensers deposit[ing] at least some of the drops of their respective drop sets on a same pass over the substrate' of claim 23.

In column 5, line 51, Gamble et al teach the apparatus is capable of depositing nucleotide monomers, which when combined with using the groups of jets in the consecutive manner, reads on the 'biomonomer containing drops is deposited from the same dispenser for each feature of the feature sets' of claim 21.

In column 9, lines 2-3, Gamble et al teach a jet sample reservoir holding 0.2 to 20 microliters, reading on 'each dispenser holding no more than 100 microliters' of claim 20.

In figure 6 Gamble et al disclose a 7 by 5 array comprising a 5 by 5 neighboring feature set having approximately a 2 x distance between the neighboring sets of features, reading on '[a] distance between at least two neighboring sets of features [being] greater than an average distance between features within the sets, both as measured in a same direction' of claim 18 as well as a 'a distance between at least two neighboring feature sets [being] greater than a greatest distance separating features within the sets, both distances as measured in a same direction' of claim 26.

In figure 7, Gamble et al teach an alternative embodiment in which 16 microspot features are deposited circumferentially, on a disk, which reads on a 'set of neighboring features includ[ing] at least four features in a non-linear configuration' of claim 25

In the abstract Gamble et al teach that the distance between features is at least about 15 microns and, as mentioned above, that there is an advantage to include 2 to 3 fold [spot] redundancy which when combined reads on 'the distance between neighboring sets of features is no greater than 2 mm' of claim 28.

In column 4, first paragraph, Gamble et al teach that the entire system is controlled by a computer program, including x-y movement of the dispensers, droplet deposition, etc. Said computer program of Gamble et al provides all of the apparatus capabilities mentioned above and therefore reads on the computer program per claims 29-31, 33-34 that controls the apparatus set forth in claims 17-18,20-23, 25, 26 and 28 of the instant application.

5. Claims 17, 18, 21, 26 and 29,30,34 are rejected under 35 U.S.C. 102(b) as being anticipated by Baldeschwieler et al (US Patent 5847105 – IDS entry 2/21/2006).

Baldeschwieler et al teach, throughout the document and especially figure 1A, an ink-jet apparatus for performing sequential reactions at defined loci on a microporous matrix to produce a biological oligomer array, which reads on the 'apparatus for fabricating an array' of the preamble of claim 17. The formation of contaminating "satellite" droplets is sidestepped via the vertical pores shown in figure 1B.

In figure 2 Baldeschwieler et al teach a head comprising a multiple dispensers per head, reading on the 'head system with multiple pulse-jet dispensers' of claim 17 part (a).

In figure 4, Baldeschwieler et al disclose preparing one column of the array which employs a conveyor belt as a transport system to move the microporous matrix, reading on the 'transport system to move the head system with respect to the substrate' of claim 17 part (b).

In column 9, lines 34-62, Baldeschwieler et al teach that the ink-jet device is controlled by a C/C++ computer program called ASyn with a Windows interface, which inherently requires the use of a CPU (central processing unit) and therefore reads on the 'processor which controls the head and transport system' of claim 17 part (c).

Baldeschwieler et al teach in column 6, line 64-67 through column 7 lines 1-11 how the ink-jet apparatus is used to prepare oligonucleotide sequences at specific loci, employing plural phosphoramidite and singular tetrazole dispensers. The tetrazole dispenser of Baldeschwieler et al is used at each and every spot and therefore reads on

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'deposit[ing] at least one set of drops from a corresponding same dispenser onto a substrate for each of multiple sets of neighboring features' of claim 17 part (c)

In preparing a set of spots consisting of AAAA, TTTT, GGGG and CCCC, each phosphoramidite dispenser (ATC or G) of Baldeschwieler et al would be used for one spot exclusively and therefore reads on 'the feature sets formed from drops deposited by respective different dispenser' of claim 17 part (c) and the 'biomonomer containing drops is deposited from the same dispenser for each feature of the feature sets' of claim 21.

In figure 4 and column 9, line 5, Baldeschwieler et al teach that the dispensers shown can move in the transverse direction (into the page), thus providing the capability of generating neighboring feature sets -- spotted across the belt. Longitudinally, (in the direction of the conveyor belt movement) the spotted features are disclosed as having approximately a 3 x distance (depending on the timing of ink-jet firing) between the neighboring sets of features, reading on '[a] distance between at least two neighboring sets of features [being] greater than an average distance between features within the sets, both as measured in a same direction' of claim 18 as well as a 'a distance between at least two neighboring feature sets [being] greater than a greatest distance separating features within the sets, both distances as measured in a same direction' of claim 26.

Said Asyn computer program of Baldeschwieler et al provides all of the apparatus capabilities mentioned above and therefore reads on the computer program

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of claims 29,30,34 which are drawn to a computer program for controlling the apparatus set forth in claim 17 and 26 of the instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 17, 18, 20-23, 25, 26, 28, 29-31, 33-34 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gamble et al** (US Patent 6001309) in view of **Suovaniemi et al** (US Patent 4215092).

The claimed invention is drawn to an apparatus for fabricating an array, comprising: (a) a head system with multiple pulse jet drop dispensers; (b) a transport system to move the head system with respect to a substrate; (c) a processor which controls the head and transport system so as to deposit at least one set of drops from a corresponding same dispenser onto a substrate for each of multiple sets of neighboring features, so as to form the array with the feature sets formed from drops deposited by respective different dispensers. Claims 18,20-23, 25,26 and 28 represent variations thereof. Claims 29-31, 33-34 are drawn to a computer program for controlling the apparatus set forth in claims 17,18, 20-23, 25, 26 and 28. The apparatus of claim 19 additionally comprises a loading station with receptacles to retain multiple different fluids such that the dispensers can be simultaneously brought into contact with respective receptacles for loading the dispensers with the different fluids.

Gamble et al teach, throughout the document, and especially figures 6 and 10, column 13 line 28 and column 1 lines 33-39, an apparatus comprising jets formed in arrays, an x-y positioner and a master controller, all for fabricating large arrays of microspots comprising biological oligomers. The tight microspots of Gamble et al circumvent the problem of contaminating "satellite" droplets.

The apparatus for preparation of large arrays of microspots of Gamble et al is taken to be the 'apparatus for fabricating an array' of the preamble of claim 17. The jets formed in arrays of Gamble et al is taken to be the 'head system with multiple pulse jet drop dispensers' of claim 17 part (a) as well as 'the different dispensers of the head system are moved in unison by the transport system' of claim 22. The x-y positioner of Gamble et al is taken to be the 'transport system to move the head system with respect to a substrate' of claim 17 part (b). The master controller of Gamble et al is taken to be the 'processor which controls the head and transport system' of claim 17 part (c).

Gamble et al teach in column 9, lines 15-18 that the groups of jets can provide a plurality of spots being formed simultaneously, concurrently or consecutively in an interrupted manner. Furthermore, in column 12, lines 26-28 Gamble et al state there is an advantage to include 2 to 3 fold [spot] redundancy, therein providing neighboring feature sets.

Simultaneous or concurrent drop deposition with two identically loaded heads of Gamble et al is taken to be capable of 'deposit[ing] at least one set of drops from a corresponding same dispenser onto a substrate for each of multiple sets of neighboring features, so as to form the array with the feature sets formed from drops deposited by

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respective different dispensers' of claim 17 part (c). Whereas, consecutive deposition of Gamble et al is taken to as capable of 'different dispensers deposit[ing] at least some of the drops of their respective drop sets on a same pass over the substrate' of claim 23.

In column 5, line 51, Gamble et al teach the apparatus is capable of depositing nucleotide monomers, which when combined with using the groups of jets in the consecutive manner, is taken to be the 'biomonomer containing drops is deposited from the same dispenser for each feature of the feature sets' of claim 21.

In column 9, lines 2-3, Gamble et al teach a jet sample reservoir holding 0.2 to 20 microliters, which is in the range of 'each dispenser holding no more than 100 microliters' per claim 20.

In figure 6 Gamble et al describe a 7 by 5 array comprising a 5 by 5 neighboring feature set having approximately a 2 x distance between the neighboring sets of features, which is taken to be '[a] distance between at least two neighboring sets of features [being] greater than an average distance between features within the sets, both as measured in a same direction' of claim 18 as well as a 'a distance between at least two neighboring feature sets [being] greater than a greatest distance separating features within the sets, both distances as measured in a same direction' of claim 26.

In figure 7, Gamble et al teach an alternative embodiment in which 16 microspot features are deposited circumferentially, on a disk, which is taken to be a 'set of neighboring features include[ing] at least four features in a non-linear configuration' of claim 25

In the abstract Gamble et al teach that the distance between features is at least about 15 microns and, as mentioned above, that there is an advantage to include 2 to 3 fold [spot] redundancy which when combined is taken to be 'the distance between neighboring sets of features is no greater than 2 mm' of claim 28.

In column 4, first paragraph, Gamble et al teach that the entire system is controlled by a computer program, including x-y movement of the dispensers, droplet deposition, etc. Said computer program of Gamble et al provides all of the apparatus capabilities mentioned above and therefore is taken to be the computer program per claims 29-31, 33-34 that controls the apparatus set forth in claims 17-18, 20-23, 25, 26 and 28 of the instant application.

Whereas Gamble et al does teach a robotic pipette loading station for the jet dispensers comprising microtiter plates (figure 10, element 302), which is taken to be 'a loading station with receptacles to retain multiple different fluids' of claim 19, Gamble et al does not teach the capability of loading the dispensers *simultaneously* with different fluids.

Suovaniemi et al, throughout the publication and especially figure 1, teach a multi-channel pipette which allows for simultaneous pipetting of different samples from different wells of a microtiter plate.

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to include the multi-channel pipette of Suovaniemi et al as part of the apparatus of Gamble et al.

One of ordinary skill in the art would have been motivated to use the multichannel pipette of Suovaniemi et al with the apparatus of Gamble et al because it would have improved throughput. In column 13, lines 50-65, Gamble et al note the tremendous time savings gained by spotting in parallel, as opposed to, in series. Loading the jet dispensers in parallel would have served to further reduce the time required to complete fabrication of an array.

One of ordinary skill in the art could have used the multi-channel pipette of Suovaniemi et al with the apparatus of Gamble et al with a reasonable expectation of success since multi-channel pipettes have been known in the art to streamline ELISAs and other assays for some time.

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Gamble et al** (US Patent 6001309) in view of **Suovaniemi et al** (US Patent 4215092) as applied to claims 17,18,20-23, 25, 26, 28, 29-31, 33-34 and 19 above, and further in view of **Quinn et al** (US Patent 4685998).

The apparatus of claim 27 additionally comprises a substrate cutter, and wherein the processor causes multiple arrays to be fabricated on a same substrate, and additionally causes the cutter to separate the substrate into multiple segments each carrying at least one of the arrays.

Gamble et al (US Patent 6001309) in view of **Suovaniemi et al** is relied on as above.

Neither Gamble et al or Suovaniemi et al teach a cutter under computer control, however.

Quinn et al throughout the publication, and especially column 3, lines 8-11 and figure 1 teach a wafer (functionally equivalent to a large substrate) in which a saw and punch-out device is used to extract "dice" (a.k.a. chips).

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to add the wafer saw and punch-out device under computer control of Quinn et al to the apparatus of Gamble et al in view of Suovaniemi et al.

One of ordinary skill in the art would have been motivated to make the apparatus of Gamble et al in view of Suovaniemi et al and incorporate the wafer saw and punch-out device under computer control of Quinn et al because the density and small size (micron scale) of the deposited features would have made excision by hand difficult without damaging the array.

One of ordinary skill in the art could have made the apparatus of Gamble et al in view of Suovaniemi et al incorporating the wafer saw and punch-out device under computer control of Quinn et al with a reasonable expectation of success since computer controlled saws and punch-out devices have been used for integrated circuit (chip) manufacturing for some time.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory

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obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 17-34 are provisionally rejected on the ground of nonstatutory

obviousness-type double patenting as being unpatentable over claims 20-35 of copending Application No. 10/649105.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 20 of copending Application No. 10/649105, draw to an apparatus comprising a multiple pulse-jet head, transport system and dispenser controlling processor, which is programmed slightly differently than the processor of claim 17 of the instant invention, otherwise comprises the same elements. Said programming differences represent routine experimental optimizations.

Similarly, claims 26 and 35 of application 10/649105, drawn to a computer program controlling the apparatus of claims 20-25 of copending Application No. 10/649105 represent routine experimental optimizations versus claims 29-31, 33-34 of

the instant application, drawn to a computer program for controlling the apparatus set forth in claims 17,18,20-23, 25,26 and 28 of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

9. No claims allowed.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Gross whose telephone number is (571)272-4446. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571)272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher M Gross
Examiner
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PATENT EXAMINER